

CLAIMS

1 1. A method for providing automated diagnostic services for a cluster
2 computer system comprising a plurality of nodes, each of the plurality of nodes
3 providing an application to a plurality of clients, the method comprising the steps of:
4 receiving a current value of a network parameter related to cluster middleware
5 associated with the cluster computer system;
6 analyzing the current value of the network parameter relative to a
7 predetermined reference value for the network parameter; and
8 providing information based on the analysis of the current value relative to the
9 predetermined reference value.

1 2. The method of claim 1, wherein the network parameter relates to a
2 network heartbeat interval for a node in the cluster computer system and the
3 predetermined reference value is an optimal network heartbeat interval for the node
4 based on the current heartbeat link for the node.

1 3. The method of claim 2, wherein the step of analyzing the current value
2 of the network heartbeat interval relative to the optimal network heartbeat interval
3 comprises determining whether the difference between the current value and the
4 optimal network heartbeat interval is within a predetermined variance.

1 4. The method of claim 3, wherein the step of providing information
2 based on the analysis of the current value relative to the optimal network heartbeat
3 interval comprises providing a warning of a potential failover recovery problem if the
4 difference between the current value and the optimal network heartbeat interval is not
5 within the predetermined variance.

1 5. The method of claim 3, further comprising the step of determining
2 whether an alternative heartbeat link for the node is available if the difference between
3 the current value and the optimal network heartbeat interval is not within the
4 predetermined variance.

1 6. The method of claim 3, further comprising the step of repeating the
2 above steps for another node in the cluster computer system if the difference between
3 the current value and the optimal network heartbeat interval is within the
4 predetermined variance.

1 7. The method of claim 5, further comprising the step of providing a
2 warning of a potential failover recovery problem if an alternative heartbeat link for the
3 node is not available.

1 8. The method of claim 5, further comprising the step of, if an alternative
2 heartbeat link for the node is available, determining the optimal network heartbeat
3 interval for the node based on the alternative heartbeat link for the node and analyzing
4 the current value of the network heartbeat interval relative to the optimal network
5 heartbeat interval associated with the alternative heartbeat link for the node.

1 9. The method of claim 1, wherein the network parameter relates to a
2 node timeout value for a node in the cluster computer system and the predetermined
3 reference value comprises a predefined threshold range for the node timeout value.

1 10. The method of claim 9, wherein the predefined threshold range for the
2 node timeout value is based on a function of a network heartbeat interval for the node.

1 11. The method of claim 10, wherein the step of analyzing the current
2 value of the node timeout value relative to the predefined threshold range comprises
3 determining whether the current value of the node timeout value is within a
4 predetermined variance.

1 12. The method of claim 11, wherein the step of providing information
2 based on the analysis of the current value relative to the predefined threshold range for
3 the node timeout value comprises providing a warning that the node timeout value is
4 not within the predefined threshold range.

1 13. The method of claim 12, wherein the step of providing information
2 based on the analysis of the current value relative to the predefined threshold range for
3 the node timeout value further comprises generating an instruction configured to set
4 the node timeout value within the predefined threshold range.

1 14. The method of claim 12, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the step of providing
3 information based on the analysis of the current value relative to the predefined
4 threshold range and the predefined recommended range further comprises, if the
5 current value of the node timeout value is greater than the upper bound of the
6 predefined threshold range, providing a warning that the node timeout value is too
7 high and generating an instruction configured to set the node timeout value of the
8 node to the upper bound of the predefined threshold range.

1 15. The method of claim 12, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the step of providing
3 information based on the analysis of the current value relative to the predefined
4 threshold range and the predefined recommended range further comprises, if the
5 current value of the node timeout value is greater than the upper bound of the
6 predefined recommended range, determining whether an empirical condition
7 associated with the cluster computer system exists that suggests the current value of
8 the node timeout value should be greater than the upper bound of the predefined
9 recommended range.

1 16. The method of claim 15, further comprising the step of, if an empirical
2 condition does not exist, providing a warning that the node timeout value is too high
3 and generating an instruction configured to set the node timeout value of the node to
4 the upper bound of the predefined threshold range.

1 17. The method of claim 12, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the step of providing
3 information based on the analysis of the current value relative to the predefined
4 threshold range and the predefined recommended range further comprises, if the
5 current value of the node timeout value is less than the lower bound of the predefined
6 recommended range, determining whether an empirical condition associated with the
7 cluster computer system exists that suggests the current value of the node timeout
8 value should be less than the upper bound of the predefined recommended range.

1 18. The method of claim 17, further comprising the step of, if an empirical
2 condition does not exist, providing a warning that the node timeout value is too low
3 and generating an instruction configured to set the node timeout value of the node to
4 the lower bound of the predefined recommended range.

1 19. The method of claim 12, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the step of providing
3 information based on the analysis of the current value relative to the predefined
4 threshold range and the predefined recommended range further comprises, if the
5 current value of the node timeout value is not less than the lower bound of the
6 predefined threshold range, providing a warning that the node timeout value is too low
7 and generating an instruction configured to set the node timeout value of the node to
8 the lower bound of the predefined threshold range.

1 20. The method of claim 1, wherein the network parameter relates to an
2 autostart timeout interval for a node in the cluster computer system and the
3 predetermined reference value comprises a predefined range for the autostart timeout
4 interval.

1 21. The method of claim 20, wherein the step of analyzing the current
2 value of the autostart timeout interval relative to the predefined range comprises
3 determining whether the current value of the autostart timeout interval is within the
4 predefined range.

1 22. The method of claim 21, wherein the step of providing information
2 based on the analysis of the current value relative to the predefined range for the
3 autostart timeout interval comprises, if the current value of the autostart timeout
4 interval is above the upper bound of the predefined range, providing an instruction
5 configured to decrease the autostart timeout interval of the node.

1 23. The method of claim 21, wherein the step of providing information
2 based on the analysis of the current value relative to the predefined range for the
3 autostart timeout interval comprises, if the current value of the autostart timeout
4 interval is below the lower bound of the predefined range, providing an instruction
5 configured to increase the autostart timeout interval of the node.

1 24. The method of claim 21, wherein the step of determining whether the
2 current value of the autostart timeout interval is within the predefined range is
3 performed after determining that a cluster unification process has been initiated during
4 reboot of the node.

1 25. The method of claim 1, wherein the network parameter relates to a
2 network polling interval for a node in the cluster computer system and the
3 predetermined reference value comprises a predefined range for the autostart timeout
4 interval.

1 26. The method of claim 25, wherein the step of analyzing the current
2 value of the network polling interval relative to the predefined range comprises
3 determining whether the current value of the network polling interval is within the
4 predefined range.

1 27. The method of claim 26, wherein the step of providing information
2 based on the analysis of the current value relative to the predefined range for the
3 network polling interval comprises, if the current value of the network polling interval
4 is above the upper bound of the predefined range, providing an instruction configured
5 to decrease the network polling interval of the node.

1 28. The method of claim 26, wherein the step of providing information
2 based on the analysis of the current value relative to the predefined range for the
3 network polling interval comprises, if the current value of the network polling interval
4 is below the lower bound of the predefined range, providing an instruction configured
5 to increase the network polling interval of the node.

1 29. The method of claim 26, wherein the step of determining whether the
2 current value of the network polling interval is within the predefined range is
3 performed after determining that the network polling has been set.

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1 30. A system for providing automated diagnostic services for a cluster
2 computer system comprising a plurality of nodes, each of the plurality of nodes
3 providing a mission-critical application to a plurality of clients, the system
4 comprising:
5 a first portion of logic configured to receive a current value of a network
6 parameter related to cluster middleware associated with the cluster computer system;
7 a second portion of logic configured to analyze the current value of the
8 network parameter relative to a predetermined reference value for the network
9 parameter; and
10 a third portion of logic configured to provide information based on the analysis
11 of the current value relative to the predetermined reference value.

1 31. The system of claim 30, further comprising a computer configured to
2 store and implement the first, second, and third portions of logic.

1 32. The system of claim 30, wherein the first, second, and third portions of
2 logic are embodied in an operating system associated with the computer.

1 33. The system of claim 30, wherein the first, second, and third portions of
2 logic are embodied in cluster middleware associated with the computer.

1 34. The system of claim 30, further comprising a network interface card
2 configured to communicate with a cluster interface.

1 35. The system of claim 34, further comprising one or more clients in
2 communication with the computer via the cluster interface.

1 36. The system of claim 30, further comprising a network interface
2 configured to communicate with the cluster computer system via a communications
3 network and wherein the current value of the network parameter is received via a
4 communications network and the information based on the analysis is provided to the
5 cluster computer system via the communications network.

1 37. The system of claim 30, wherein the network parameter relates to a
2 network heartbeat interval for a node in the cluster computer system and the
3 predetermined reference value is an optimal network heartbeat interval for the node
4 based on the current heartbeat link for the node.

1 38. The system of claim 37, wherein the second portion of logic is further
2 configured to determine whether the difference between the current value and the
3 optimal network heartbeat interval is within a predetermined variance.

1 39. The system of claim 38, wherein the third portion of logic is further
2 configured to provide a warning of a potential failover recovery problem if the
3 difference between the current value and the optimal network heartbeat interval is not
4 within the predetermined variance.

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1 40. The system of claim 38, further comprising a fourth portion of logic
2 configured to determine whether an alternative heartbeat link for the node is available
3 if the difference between the current value and the optimal network heartbeat interval
4 is not within the predetermined variance.

1 41. The system of claim 38, further comprising a fourth portion of logic
2 configured to repeat the first, second, and third portions of logic for another node in
3 the cluster computer system if the difference between the current value and the
4 optimal network heartbeat interval is within the predetermined variance.

1 42. The system of claim 40, further comprising a fifth portion of logic
2 configured to provide a warning of a potential failover recovery problem if an
3 alternative heartbeat link for the node is not available.

1 43. The system of claim 40, further comprising a fifth portion of logic
2 configured to determine, if an alternative heartbeat link for the node is available, the
3 optimal network heartbeat interval for the node based on the alternative heartbeat link
4 for the node and analyze the current value of the network heartbeat interval relative to
5 the optimal network heartbeat interval associated with the alternative heartbeat link
6 for the node.

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1 44. The system of claim 30, wherein the network parameter relates to a
2 node timeout value for a node in the cluster computer system and the predetermined
3 reference value comprises a predefined threshold range for the node timeout value.

1 45. The system of claim 44, wherein the predefined threshold range for the
2 node timeout value is based on a function of a network heartbeat interval for the node.

1 46. The system of claim 45, wherein the third portion of logic is further
2 configured to determine whether the current value of the node timeout value is within
3 a predetermined variance.

1 47. The system of claim 46, wherein the third portion of logic is further
2 configured to provide a warning that the node timeout value is not within the
3 predefined threshold range.

1 48. The system of claim 47, wherein the third portion of logic is further
2 configured to generate an instruction configured to set the node timeout value within
3 the predefined threshold range.

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1 49. The system of claim 47, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the third portion of
3 logic is further configured to, if the current value of the node timeout value is greater
4 than the upper bound of the predefined threshold range, provide a warning that the
5 node timeout value is too high and generate an instruction configured to set the node
6 timeout value of the node to the upper bound of the predefined threshold range.

1 50. The system of claim 47, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the third portion of
3 logic is further configured to, if the current value of the node timeout value is greater
4 than the upper bound of the predefined recommended range, determine whether an
5 empirical condition associated with the cluster computer system exists that suggests
6 the current value of the node timeout value should be greater than the upper bound of
7 the predefined recommended range.

1 51. The system of claim 50, further comprising a fourth portion of logic
2 configured to, if an empirical condition does not exist, provide a warning that the node
3 timeout value is too high and generate an instruction configured to set the node
4 timeout value of the node to the upper bound of the predefined threshold range.

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1 52. The system of claim 47, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the third portion of
3 logic is further configured to, if the current value of the node timeout value is less than
4 the lower bound of the predefined recommended range, determine whether an
5 empirical condition associated with the cluster computer system exists that suggests
6 the current value of the node timeout value should be less than the upper bound of the
7 predefined recommended range.

1 53. The system of claim 52, wherein the third portion of logic is further
2 configured to, if an empirical condition does not exist, provide a warning that the node
3 timeout value is too low and generate an instruction configured to set the node timeout
4 value of the node to the lower bound of the predefined recommended range.

1 54. The system of claim 47, wherein the predetermined reference value
2 further comprises a predefined recommended range and wherein the third portion of
3 logic is further configured to, if the current value of the node timeout value is not less
4 than the lower bound of the predefined threshold range, provide a warning that the
5 node timeout value is too low and generate an instruction configured to set the node
6 timeout value of the node to the lower bound of the predefined threshold range.

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1 55. The system of claim 30, wherein the network parameter relates to an
2 autostart timeout interval for a node in the cluster computer system and the
3 predetermined reference value comprises a predefined range for the autostart timeout
4 interval.

1 56. The system of claim 55, wherein the second portion of logic is further
2 configured to determine whether the current value of the autostart timeout interval is
3 within the predefined range.

1 57. The system of claim 56, wherein the third portion of logic is further
2 configured to, if the current value of the autostart timeout interval is above the upper
3 bound of the predefined range, provide an instruction configured to decrease the
4 autostart timeout interval of the node.

1 58. The system of claim 56, wherein the third portion of logic is further
2 configured to, if the current value of the autostart timeout interval is below the lower
3 bound of the predefined range, provide an instruction configured to increase the
4 autostart timeout interval of the node.

1 59. The system of claim 56, wherein the second portion of logic is further
2 configured to determine whether the current value of the autostart timeout interval is
3 within the predefined range is performed after determining that a cluster unification
4 process has been initiated during reboot of the node.

1 60. The system of claim 30, wherein the network parameter relates to a
2 network polling interval for a node in the cluster computer system and the
3 predetermined reference value comprises a predefined range for the network polling
4 interval.

1 61. The system of claim 60, wherein the second portion of logic is further
2 configured to determine whether the current value of the network polling interval is
3 within the predefined range.

1 62. The system of claim 61, wherein the third portion of logic is further
2 configured to, if the current value of the network polling interval is above the upper
3 bound of the predefined range, provide an instruction configured to decrease the
4 network polling interval of the node.

1 63. The system of claim 61, wherein the third portion of logic is further
2 configured to, if the current value of the network polling interval is below the lower
3 bound of the predefined range, provide an instruction configured to increase the
4 network polling interval of the node.

1 64. The system of claim 61, wherein the second portion of logic is further
2 configured to determine whether the current value of the network polling interval is
3 within the predefined range is performed after determining that the network polling
4 has been set.

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